CLAIMS

We Claim:

1. A waveguide system comprising:

a support substrate;

a bottom cladding layer formed on top of the support substrate;

a plurality of core channels suitable for optical transmission formed on top of the bottom cladding layer; and

a top cladding layer formed on top of both the bottom cladding layer and the core channels such that the core channels are sandwiched between the bottom and the top cladding layer, the top cladding layer leaving an end of at least some of the core channels exposed to ambient air whereby light can enter and exit out of the ends of the core channels.

2 A waveguide system as recited in claim 1 further comprising:

an optical lens which is formed proximate to the end of each respective core channel that is exposed to ambient air and wherein each optical lens is also formed on top of the bottom cladding layer.

4. A waveguide system as recited in claim 1 wherein at least some of the core channels have a curved section wherein a lengthwise portion of a respective core channel follows a curved path, and wherein the top cladding layer has at least one curve opening that exposes the curved section of the core channel to the ambient air so that a radius of the curved section is smaller than when the top cladding layer covers the curved section.

5. A waveguide system as recited in claim 4 wherein the index of refraction of the core channels is at least approximately 0.3 greater than the index of refraction of the bottom cladding layer and of the ambient air, respectively.

6. A waveguide system as recited in claim 4 wherein the curve opening exposes a curved section of more than one core channel.

7. A waveguide system as recited in claim 4 wherein the shape of the curve opening conforms to the curved path of the curved section of a respective core channel.

8. A waveguide system as recited in claim 4 wherein the curved path of the curved section of a respective core channel follows a turn of approximately 90 degrees or more.

9. A waveguide system as recited in claim 1 wherein the top cladding layer has at least one access via that exposes a core channel to the ambient air, whereby the access via provides access for optical communication with the exposed core channel.

10. A waveguide system as recited in claim 9 further comprising an external optical device placed proximate to the access via such that the external optical device is in optical communication with the exposed core channel.

11. A waveguide system as recited in claim 9 wherein the access via exposes a plurality of core channels to the ambient air, whereby the access via provides access for optical communication with the exposed core channels.

12. A waveguide system as recited in claim 1 wherein the core channels are formed of a polymer material.

13. A waveguide system comprising:

a support substrate;

a bottom cladding formed on top of the support substrate;

a plurality of core channels wherein at least some of the core channels have a curved section wherein a lengthwise portion of a respective core channel follows a curved path; and

a selectively patterned top cladding layer formed on top of both the bottom cladding layer and the core channels such that the core channels are sandwiched between the bottom and the top cladding layer, wherein the top cladding is selectively pattered to have at least one curve opening that exposes the curved section of a respective core channel to the ambient air so that a radius of the curved section is smaller than when the top cladding layer covers the curved section.

14. A waveguide system as recited in claim 13 wherein the index of refraction of the core channels is at least approximately 0.3 greater than the index of refraction of the bottom cladding layer and of the ambient air, respectively.

15. A waveguide system as recited in claim 13 wherein the curve opening exposes a curved section of more than one core channel.

16. A waveguide system as recited in claim 13 wherein the curved path of the curved section of a respective core channel follows a turn of approximately 90 degrees or more.

17. A waveguide system as recited in claim 13 wherein the top cladding layer has at least one access via that exposes a core channel to the ambient air, whereby the access via provides access for optical communication with the exposed core channel.

18. A waveguide system as recited in claim 17 further comprising an external optical device placed proximate to the access via such that the external optical device is in optical communication with the exposed core channel.

19. An apparatus, comprising:

a light source;

a multi-channel transmission waveguide optically coupled to receive light from the light source, the transmission waveguide producing a set of light beams by guiding the light received from the light source so that the set of light beams emanate from the transmission waveguide in a first direction;

a multi-channel reception waveguide spaced apart from the transmission waveguide in the first direction, the reception waveguide receiving the set of light beams emanating from the transmission waveguide;

wherein the transmission waveguide and the reception waveguide are each formed of at least,

a support substrate;

a bottom cladding layer formed on top of the support substrate;

a plurality of core channels suitable for optical transmission formed on top of the bottom cladding layer, each of the core channels having a first end and a second end; and

a top cladding layer formed on top of both the bottom cladding layer and the core channels such that the core channels are sandwiched between the bottom and the top cladding layer, the top cladding layer leaving the second end of at least some of the core channels exposed to ambient air whereby the light beams can enter into or exit out of the second end of the core channels; and

a light detector optically coupled to the reception waveguide to receive the light from the reception waveguide, the light detector including a plurality of light detecting elements that detect light intensity of the light from the reception waveguide.

20. An apparatus as recited in claim 19 wherein the apparatus is an input device for an electronic device, and

wherein an input area is produced between the transmission waveguide and the reception waveguide.

21. An apparatus as recited in claim 19 wherein at least some of the core channels of the transmission waveguide and the reception waveguide have a curved section wherein a lengthwise portion of a respective core channel follows a curved path, and wherein the top cladding layer has at least one curve opening that exposes the curved section of the core channel to the ambient air so that a radius of the curved section is smaller than when the top cladding layer covers the curved section.

22. An apparatus as recited in claim 21 wherein the index of refraction of the core channels is at least approximately 0.3 greater than the index of refraction of the bottom cladding layer and of the ambient air, respectively.

23. An apparatus as recited in claim 21 wherein the curved path of the curved section of a respective core channel follows a turn of approximately 90 degrees or more.

24. An apparatus as recited in claim 19 wherein the top cladding layer of each of the transmission waveguide and the reception waveguide has at least one access via that exposes a core channel to the ambient air, whereby the access via provides access for optical communication with the exposed core channel.

25. An apparatus as recited in claim 24 further comprising an external optical device placed proximate to the access via of each of the transmission waveguide and the reception waveguide such that the external optical devices are in optical communication with the respective exposed core channels.